The Mega Meeting: Power Plant Air Pollutant Control Symposium

August 30 – September 2, 2004

Washington D.C., USA

The fifth "Mega" Symposium on air pollutant controls for power plants, co-sponsored by EPRI, the U.S. Environmental Protection Agency (EPA), the U.S. Department of Energy (DOE), along with the Air & Waste Management Association (A&WMA) again covered SO_2, NOx, particulate, mercury and air toxic emissions. This multi-pollutant conference continued the Mega Symposium tradition of highlighting the latest development and operational experience with state-of-the-art methods for reducing air emissions from fossil-fuelled boilers. Approximately 800 delegates attended the technical sessions and there was an accompanying trade show. From the sessions it was apparent that 3 different technologies based on gold are being developed for control of mercury emissions from coal fired power stations. Presence of mercury has been linked to the onset of Alzheimer's disease and autism, and in the future strict limits on mercury emissions from coal-fired boilers in the utility industry are expected. It appears that gold is seriously being considered for mercury emission control primarily due to its unrivalled mercury adsorption properties, although its role as a mercury oxidation catalyst is also highlighted.

In a talk, 'Large Scale Demonstration of the MerCAP™ technology for Mercury Control', Timothy Ebner reported that EPRI's Mercury Control Adsorption Process (MerCAP™) is being demonstrated at two coal-fired utilities under a Department of Energy program. Gold-coated structures are being retrofitted in the existing pollution control equipment at each site and vapour-phase mercury is removed from the flue gas as it flows past the rigid structure. With this process, mercury can be recovered and the substrates can be regenerated and used repeatedly.

Gary Blythe from URS Corporation presented an interesting paper 'Pilot Testing of Oxidation catalysts for Enhanced mercury Control by Wet FGD'. He announced that The Tennessee Valley Authority (TVA) are testing a gold catalyst, prepared by Sud-Chemie Prototech USA, as a mercury oxidation catalyst at Spruce Station Power Plant, in San Antonio, Texas. The catalyst is being tested down stream of the flue gas desulfurisation (FGD) unit. TVA has patented the use of gold as a mercury oxidation catalyst in coal-fired flue gases.

A novel gold-based technology was presented by David DeBerry, URS Corporation, which under EPRI sponsorship is investigating reactive membranes, particularly solid polymer electrolyte membranes, as in-situ-regenerable mercury sorbents. In his talk 'Reactive Membranes for Removal of Mercury from Power Plant Flue Gas', he described how a gold-metallized solid polymer electrolyte (Au-SPE) has been investigated for mercury control. The basic concept is that mercury would first be specifically absorbed from the flue gas by gold deposited on an ion exchange membrane (Nafion). The mercury would then be oxidized to a cationic form, simultaneously regenerating the gold, followed by transport of the oxidized mercury species through the cationic membrane and dissolution in the liquid circulated on the inside of the membrane. In this case, the gold essentially acts as a highly specific catalyst for removing the mercury and providing a substrate for its subsequent oxidation.

In the poster session, Erick Zacher from the Energy and Environmental Research Centre, University of North Dakota, described a novel method of storage for mercury on gold-coated quartz traps. The storage of low-level mercury samples (for subsequent analysis) has always been a problem because of the properties of mercury and mercury compounds. Samples are taken in the usual manner by drawing emission gases through a quartz tube containing the gold-coated quartz. The tubes are then placed into a bottle that has been lined with a gold-plated copper screen and capped. This was reported to provide a mercury free environment for the traps and allows them to be shipped to or from a laboratory, with storage of 2 weeks resulting in no loss or uptake of mercury.

Overall, based on the technologies being presented, it seems likely that gold will play a role in mercury pollutant control from coal-fired power stations. A full description of the technical sessions can be found at www.megasymposium.org

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